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REEVALUATION OF CERTAIN 1974 DOUGLAS-FIR TUSSOCK MOTH CONTROL SPRAY AND SPRAY-OPTION AREAS IN NORTH IDAHO

by

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INTRODUCTION

During the fall of 1973 a special task force of the Northern Rockies Forest Pest Action Council conducted extensive egg mass surveys in Northern Idaho to locate potential Douglas-fir tussock moth, Orgyia pseudotsugata McDonnough, defoliation problem areas (Tunnock and Livingston 1974). This survey, in conjunction with subsequent laboratory evaluations of egg mass viability (Tunnock, Livingston, and Bousfield 1974), established that 103,878 acres of forest lands in North Idaho supported overwintering tussock moth populations capable of causing damage in 1974. An additional 153,556 acres designated as "spray-option" areas were found to be infested at population levels apparently below the minimum spray criteria established for the control project. Many of these spray-option areas contained large blocks of trees defoliated in 1973. This report summarizes the results of a follow-up project conducted during the spring of 1974 to reevaluate the potential defoliation hazard of these previously designated spray-option areas and of certain proposed spray areas that were suspected of not having a population that met the spray criteria.

METHODS

Reevaluation of Spray-Option Areas

During April and May of 1974 field crews examined approximately 100 sample plots in Northern Idaho to assess potential 1974 tussock moth populations. Due to time limitations inherent in the control project the majority of the plots were concentrated in high-priority areas within previously designated spray-option areas showing signs of aerially visible defoliation. We generally established plots along roads and on ridges within these high-priority areas, within the limits of topography and desired plot distribution. In general we tried to maintain a plot distribution of one plot per section. Later in the sampling project we also examined woodlands outside the designated spray-option areas as requested by private landowners.

1/ Survey foreman and Entomologist, respectively, State of Idaho, Department of Public Lands, Coeur d'Alene, Idaho

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Field sampling procedures involved falling sample trees and examining them for egg masses and cocoons. We felled 5 trees on each plot, divided the crown of each tree into thirds from top to bottom, and subsampled 4 branches from each 1/3 crown. For each branch we recorded the length and width of the foliage surface area, and the number of new egg masses, old egg masses, and cocoons found on the branch. Additional information recorded included estimates of the degree of defoliation of each sample tree, an estimate of the defoliation status of the general plot area, and any observations that we felt might be of value in describing the characteristics of the tussock moth population in the plot area.

We attempted, as far as possible, to locate our sample trees on a random basis within the plot area, although in many instances we had to make value judgements to obtain what we considered to be a representative sample. In general we selected our sample trees within a 1 to 2 acre plot area, and because we were sampling primarily on privately owned lands, we generally chose sub-merchantable trees less than 10 inches in diameter on the stump. In stands where we felt that we needed to sample larger trees to get into the level of the main canopy we tried, when possible, to select deformed or otherwise defective trees. When sampling small trees we selected trees growing in open areas or trees having at least an intermediate crown position, and generally avoided trees growing under a completely closed crown cover. As we progressed in the survey we also found that we tended to bias our sample in favor of grand fir, Abies grandis, because it seemed to be a better indicator of population build-up than other species.

Within the individual tree crowns we again attempted to sample branches on a random basis from each 1/3 crown. In some situations, where we felt that egg mass densities indicated by sampling main branches alone were not representative of existing condtions, we included small epicormic branches in our sample. Generally, however, we confined our sampling to main branches.

For each plot we calculated total foliage surface areas and new egg mass densities using the following formulae for the calculations:

$$\text{Area} = \frac{\text{Length x Width}}{2}$$

$$\text{Density} = \frac{\text{No. New Egg Masses x 1000}}{\text{Area}}$$

A regression analysis 2/ of data resulting from the March 1974 egg viability and virus study in the St. Joe Unit (Tunnock et al., 1974) established an egg mass density of 0.14 egg mass/1000 square inches of foliage surface area as the minimum that would result in a sufficiently high larval population to justify control measures in 1974.

2/ Developed by Wayne Bousefield, Entomologist, USFS Pest Control, State and Private Forestry, Missoula, Montana.

Reevaluation of Outlying Spray Areas of the Clearwater and St. Joe Units

A review of the data from the spring 1974 survey of egg viability, egg parasitism, and virus incidence (Tunnock et al., 1974) showed several areas that were not evaluated due to lack of egg masses. A check of the 1973 fall egg mass survey data for these same areas (Tunnock and Livingston, 1974) revealed that some had egg mass densities close to the minimum treatment level of one tenth egg mass per 1000 square inches of foliage.

In May 1974, these low population density areas were reevaluated to verify that they met the spray criteria. Sample trees were selected in defoliated areas or on ridge tops. They were felled and the majority of the branches on each were examined for the presence of cocoons and egg masses. If a substantial number of new egg masses were found the area would be scheduled for a complete reevaluation. If few or no egg masses were found the area would be dropped from the proposed spray area pending further evaluation from the air checking for new defoliation.

RESULTS

Reevaluation of Spray-Option Areas

Data from the sample plots and the defoliation hazard ratings for each plot are summarized in Table 1. Changes in spray boundaries are indicated on the enclosed map. General characteristics of the spray-option areas evaluated are as follows:

Turner Peak Area (T49N, R3W, B.M.) - Some light defoliation on the east side of Turner Peak. Egg mass densities, as calculated from our field plot data, do not meet the minimum spray criteria. Defoliation hazard is generally low.

Carlin Bay Area (T49N, R3W, B.M.) - No evidence of defoliation and no new egg masses. Defoliation hazard is low.

Plummer Butte Area (T46N, R4W, B.M.) - Some light defoliation. Egg mass densities do not meet minimum spray criteria. Defoliation hazard is low.

Windfall Pass Area (T45N, R4W, B.M.) - Patches of heavy defoliation and high egg mass densities along ridge north of Windfall Pass, with high egg mass densities in surrounding lightly defoliated and undefoliated stands. Both egg mass densities and defoliation decrease toward the north end of the area and taper to zero for the sample plots outside the designated spray-option area. Egg mass densities also seem to fall below spray criteria on the lower slopes of the main ridges and just above Windfall Pass. Defoliation hazard is generally high, with increasing moth populations.

Tensed VABM Area (T44N, R4W, B.M.) - Patches of moderate to heavy defoliation in the northern portion of this unit toward the Lolo Pass spray area, with high egg mass densities. Both defoliation and egg mass densities seem to fall below the minimum spray criteria toward the center of the unit in the immediate area of the Tensed VABM (the plot in this area was taken beneath a mature Engelmann spruce-subalpine fir overstory) and then increase again further south toward Moses Mountain. Defoliation hazard is generally high, with an increasing moth population.

Table 1.--Data from spring 1974 field reevaluation of Douglas-fir tussock moth spray option areas.

Plot Number	Plot location T.	R.	Sec.	New egg masses/ 1000 sq. inches foliage	Risk* (high or low)
1	46N	3W	20	0.00	Low
2	46N	4W	29	0.00	Low
3	46N	4W	23	0.00	Low
4	46N	4W	25	0.00	Low
5	46N	4W	25	0.00	Low
6	46N	4W	26	0.12	Low **
7	46N	4W	26	0.12	Low **
8	46N	4W	26	0.00	Low
9	46N	4W	35	0.41	High
10	46N	4W	35	1.25	High
11	45N	4W	2	0.00	Low
12	45N	4W	3	1.49	High
13	45N	4W	10	0.33	High
14	45N	4W	10	0.03	Low
15	45N	4W	16	0.03	Low
16	45N	4W	21	0.13	Low **
17	45N	4W	34	1.33	High
18	44N	4W	3	0.54	High
19	44N	4W	2	0.02	Low
20	44N	4W	2	0.00	Low
21	44N	4W	11	0.11	Low **
22	44N	4W	12	0.45	High
23	43N	5W	2	0.02	Low
24	43N	5W	10	0.17	High
25	43N	5W	10	0.75	High
26	43N	5W	11	0.75	High
27	43N	5W	12	0.38	High
28	43N	4W	7	0.08	Low
29	43N	5W	12	0.17	High
30	43N	5W	13	1.40	High
31	43N	5W	14	0.72	High
32	43N	5W	13	1.01	High
33	43N	5W	14	0.07	Low
34	43N	4W	22	0.98	High
35	43N	4W	24	0.26	High
36	43N	4W	24	0.33	High
37	43N	3W	19	0.16	High
38	43N	3W	30	0.22	High
39	43N	3W	20	0.77	High
40	43N	3W	21	0.52	High
41	43N	3W	29	0.03	Low

* Risk of defoliation is "high" on plot if estimated egg mass density exceeds 0.14 egg mass/1000 square inches foliage.

** Moderate risk: egg mass density between 0.10 and 0.14 egg mass/ 1000 square inches foliage.

Table 1.--Data from spring 1974 field reevaluation of Douglas-fir tussock moth spray option areas. (continued)

Plot Number	Plot location T.	R.	Sec.	New egg masses/ 1000 sq. inches foliage	Risk (high or low)
42	43N	3W	32	0.23	High
43	43N	3W	32	0.54	High
44	43N	3W	34	0.22	High
45	43N	3W	33	0.00	Low
46	42N	3W	2	0.13	Low **
47	42N	3W	5	0.53	High
48	42N	3W	3	0.25	High
49	42N	3W	4	1.20	High
50	42N	3W	9	0.04	Low
51	43N	2W	20	0.00	Low
52	43N	2W	20	0.34	High
53	43N	2W	28	0.00	Low
54	43N	2W	28	0.02	Low
55	42N	2W	33	0.22	Low
56	42N	2W	27	0.00	Low
57	43N	2W	35	0.09	Low
58	43N	2W	34	0.08	Low
59	43N	2W	35	0.32	Low
60	43N	1W	30	0.21	High
61	43N	1W	31	0.10	Low **
62	43N	4W	5	0.00	Low
63	42N	4W	7	0.00	Low
64	42N	4W	16	0.00	Low
65	42N	2W	33	0.04	Low
66	41N	2W	3	0.00	Low
67	41N	2W	10	0.24	High
68	41N	2W	15	0.21	High
69	41N	2W	22	0.61	High
70	41N	2W	21	0.37	High
71	41N	2W	20	0.14	High
72	41N	2W	17	0.15	High
73	41N	2W	18	0.40	High
74	41N	3W	24	1.07	High
75	41N	3W	26	0.23	High
76	40N	3W	4	1.99	High
77	40N	3W	4	0.51	High
78	40N	3W	5	3.67	High
79	40N	3W	5	1.30	High
80	40N	3W	17	0.77	High
81	40N	4W	16	0.00	Low
82	40N	3W	21	0.00	Low
83	40N	4W	1	1.59	High
84	40N	4W	12	0.19	High
85	40N	4W	11	0.57	High
86	40N	4W	10	0.42	High
87	40N	4W	4	0.50	High
88	40N	4W	9	0.24	High

Table 1.--Data from spring 1974 field reevaluation of Douglas-fir tussock moth spray option areas. (continued)

Plot Number	Plot location T.	R.	Sec.	New egg masses/ 1000 sq. inches foliage	Risk (high or low)
89	40N	4W	8	0.12	Low **
90	40N	4W	18	0.29	High
91	40N	4W	16	0.14	High
92	40N	4W	14	0.04	Low
93	40N	4W	22	0.00	Low
94	40N	4W	19	0.54	High
95	40N	4W	19	0.92	High
96	40N	5W	24	0.06	Low
97	40N	5W	11	0.00	Low
98	40N	1E	11	0.00	Low
99	40N	1E	14	0.00	Low
100	49N	3W	28	0.00	Low
101	49N	3W	27	0.02	Low
102	49N	3W	28	0.03	Low
103	49N	3W	33	0.03	Low
104	49N	3W	30	0.00	Low
105	49N	3W	31	0.00	Low
106	48N	3W	5	0.00	Low
107	49N	3W	27	0.03	Low
108	33N	4W	23	0.00	Low
109	33N	4W	22	0.00	Low
110	33N	3W	33	0.00	Low
111	32N	3W	3	0.00	Low
112	32N	3W	5	0.00	Low
113	32N	3W	4	0.02	Low
114	32N	3W	9	0.00	Low

Skyline Drive Area (T43N, R5W, B.M.) - Patches of heavy defoliation, with uniformly high egg mass densities in almost all areas sampled regardless of defoliation intensity. Two areas in the northern portion of the unit fail to meet spray criteria, with little obvious defoliation in one and light to moderate defoliation in the second. One plot near the Mission Mountain spray boundary had heavy defoliation, with egg mass densities below the minimum spray criteria. Defoliation hazard is generally high, with an increasing moth population.

Meadow Creek Drainage Area (T43N, R3W, B.M.) - Patches of heavy defoliation with uniformly high egg mass densities in almost all areas sampled, regardless of defoliation intensity. Densities below spray criteria were found only on those plots sampled in the draws of Meadow Creek and its tributaries. Defoliation hazard is high, with increasing moth populations.

Bald Mountain Area (T43N, R2W, B.M.) - Patches of heavy defoliation along ridge, with generally low egg mass densities and declining populations in most areas. Plots on both the extreme western and eastern ends of the area indicate the possibility of egg mass densities above the minimum spray criteria in those portions of the unit. Defoliation hazard is generally low.

Farber Point Area (T42N, R4W, B.M.) - No evidence of defoliation and no new egg masses. Defoliation hazard is low.

Mica Mountain Area (T41N, R2W, B.M.) - Patches of heavy defoliation along main ridges, with high egg mass densities in almost all areas sampled regardless of defoliation intensity. Both defoliation and egg mass densities decrease to levels below the minimum spray criteria north of Mica Mountain toward Sand Mountain. Defoliation hazard from Mica Mountain south in the area sampled is high, with increasing moth populations.

Moscow Mountain Area (T40N, R3 and 4W, B.M.) - Patches of heavy defoliation throughout the area sampled, with high egg mass densities in almost all areas regardless of defoliation intensity. Two southern extensions of the designated spray-option area do not meet the minimum spray criteria, while one area currently outside the designated boundaries of the spray-option area south of Moscow Mountain has a high egg mass density and defoliation hazard rating. Defoliation hazard is generally high, with an increasing moth population.

Paradise Point Area (T40N, R5W, B.M.) - No obvious defoliation and no new egg masses. Defoliation hazard is low.

Jackson Mountain Area (T40N, R1E, B.M.) - No evidence of defoliation and no new egg masses outside of current spray boundary. Defoliation hazard is low.

Craig Mountain Area (T32N, R3W, B.M.) - No evidence of defoliation and no new egg masses outside of current spray boundaries. Defoliation hazard is low.

Reevaluation of Low-Population Proposed Spray Areas

Jackson Mountain Area (T40N, R1E, B.M.) - No egg masses found. Defoliation hazard apparently low. Dropped from proposed spray area.

Johnson's Mill Area (T37N, 3E, B.M.) - No egg masses found. Defoliation hazard apparently low. Dropped from proposed spray area.

Whiskey Butte-Buck Butte Area (T37N, R4E, B.M.) - One new egg mass found. Defoliation hazard apparently low. Dropped from proposed spray area.

Hemlock Butte (T36N, R6E, B.M.) - No egg masses found. Defoliation hazard apparently low. Dropped from proposed spray area.

Acreage adjustments are as follows:

Proposed Treatment Acres Dropped from Spray Category:

Jackson Mountain	612	Acres
Johnson's Mill	1703	
Whiskey Butte-Buck Butte	1865	
Hemlock Butte	865	
Total Acres	5045	

Spray-Option Acres Added to Spray Category:

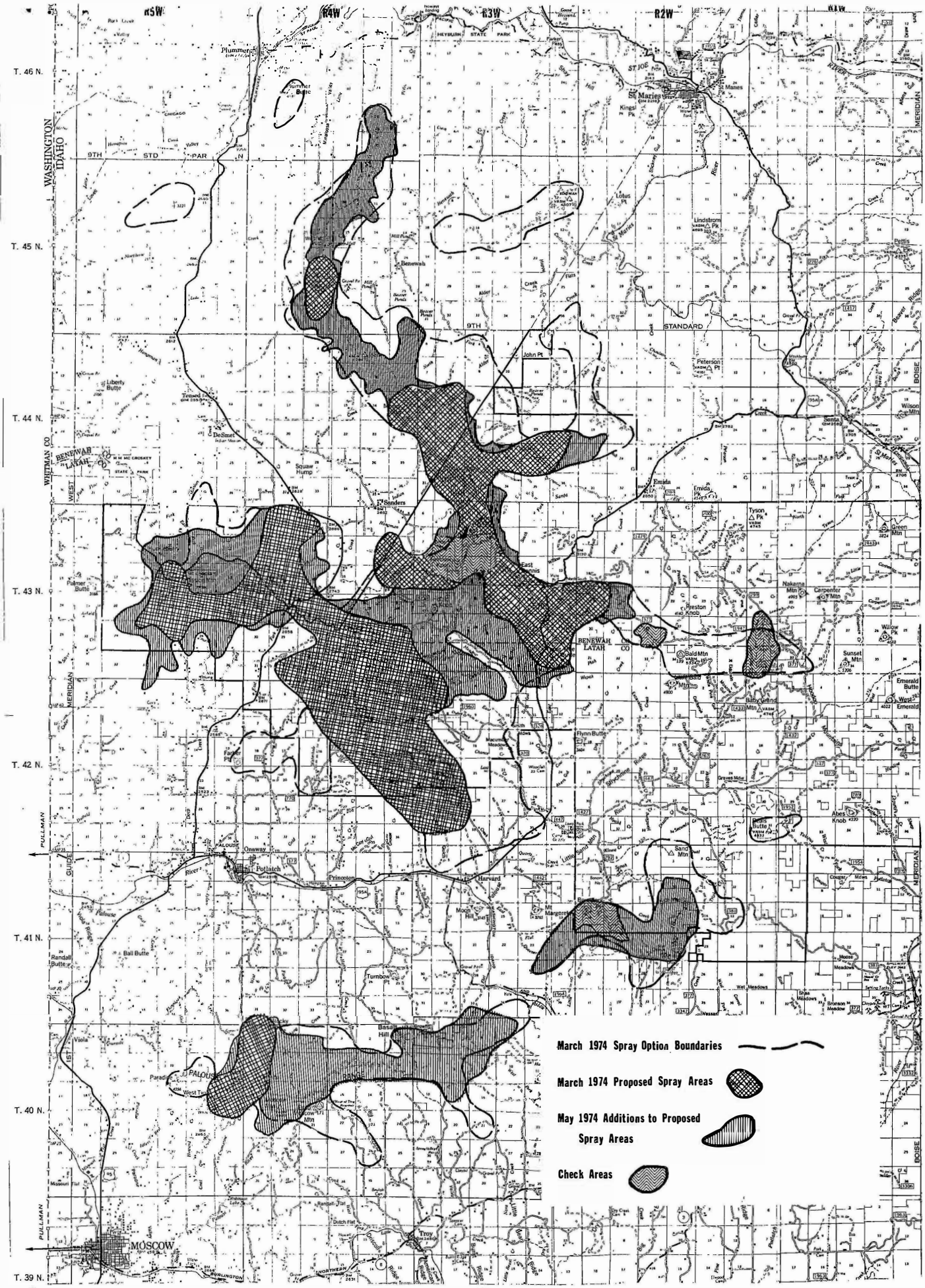
Moscow Mountain
Mica Mountain
Meadow Creek
Skyline Drive
Windfall Pass
Approximate Total Acres 34,199

March 1974 Proposed Treatment Acres, St. Joe Unit		52,846
June 1974 Proposed Treatment Acres Dropped	-	5,045
subtotal		47,801
Spray-Option Acres Added, St. Joe Unit	+	34,199
Approximate June 1974 Total Spray Acres, St. Joe Unit		82,000

REFERENCES CITED

1. Tunnock, Scott, and R. L. Livingston. 1974. Potential Douglas-fir tussock moth damage in Northern Idaho in 1974 based on a 1973 fall egg mass survey. USDA, Forest Service, Northern Region, Division State & Private Forestry, Insect & Disease Report 74-4.

2. Tunnock, Scott, R. L. Livingston, and W. E. Bousfield. 1974. Impact of egg viability, egg parasitism, and virus on 1974 Douglas-fir tussock moth defoliation patential in Northern Idaho. USDA, Forest Service, Northern Region, Division State & Private Forestry, Insect & Disease Report 74-9.



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Harvard
Mt Margaret
Basalt Hill
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MOSCOW
Liberty Butte
Palmer Butte
Squaw Hump
Lindstrom Pk
Peterson Pt
Tyson Pk
Preston Knob
Bald Mtn
Flynn Butte
Sand Mtn
Abes Knob
Emerald Butte
Sunset Mtn
Green Mtn
Wilson Mtn
Randall Butte
Ball Butte
Turnbow Pt
Viola
Paradise
Dutch Flat
March 1974 Spray Option Boundaries
March 1974 Proposed Spray Areas
May 1974 Additions to Proposed Spray Areas
Check Areas